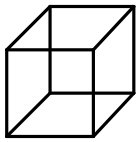
Ch. 5.1

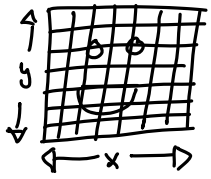
$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$A = \sum_{m=0}^{M-1} \sum_{n=0}^{N-1} d_{mn} G_{mn} = d_{00} G_{00} + d_{01} G_{01} + d_{10} G_{10} + d_{11} G_{11}$$

$$d_{mn} = \frac{\langle A, G_{mn} \rangle}{\langle G_{mn}, G_{mn} \rangle}$$



$$g_n(t) = e^{2\pi i n \frac{t}{T}}$$



$$g_{mn}(x,y) = e^{2\pi i \left(m \frac{x_k}{s} + n \frac{y_j}{T}\right)}$$

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = 2.5 \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} + C_1 \begin{bmatrix} 1 & 1 \\ -1 & -1 \end{bmatrix} + C_2 \begin{bmatrix} 1 & -1 \\ 1 & -1 \end{bmatrix} + C_3 \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

Average of A

$$d_{00} = \frac{\langle A, G_{00} \rangle}{\langle G_{00}, G_{00} \rangle} = \frac{1(1) + 2(1) + 3(1) + 4(1)}{(1)(1) + (1)(1) + (1)(1) + (1)(1)} = \frac{10}{4} = 2.5$$

$$d_{01} = \frac{\langle A, G_{01} \rangle}{\langle G_{01}, G_{01} \rangle} = \frac{1(1) + 2(1) + 3(-1) + 4(-1)}{(4)} = \frac{3 + -7}{(4)} = \frac{-4}{4} = -1$$